§ 86.1912 How do I determine whether an engine meets the vehicle-pass criteria?

In general, the average emissions for each regulated pollutant must remain at or below the NTE threshold in paragraph (a) of this section for at least 90 percent of the valid NTE sampling events, as defined in paragraph (b) of this section. For 2007 through 2009 model year engines, the average emissions from every NTE sampling event must also remain below the NTE thresholds in paragraph (f)(2) of this section. Perform the following steps to determine whether an engine meets the vehicle-pass criteria:

(a) Determine the NTE threshold for each pollutant subject to an NTE standard by adding all three of the following terms and rounding the result to the same number of decimal places as the applicable NTE standard:

(1) The applicable NTE standard.

(2) The in-use compliance testing margin specified in § 86.007–11(h), if any.

(3) An accuracy margin for portable in-use equipment when testing is performed under the special provisions of § 86.1930, depending on the pollutant, as follows:

(i) NMHC: 0.17 grams per brake horsepower-hour.

(ii) CO: 0.60 grams per brake horsepower-hour.

(iii) NO_X: 0.50 grams per brake horsepower-hour.

(iv) PM: 0.10 grams per brake horsepower-hour.

(v) NO_X + NMHC: 0.67 grams per brake horsepower-hour.

(4) Accuracy margins for portable in-use equipment when testing is not performed under the special provisions of § 86.1930 for 2007 through 2009 model year engine families that are selected for testing in any calendar year as follows:

(i) NMHC using the emission calculation method specified in 40 CFR 1065.650(a)(1): 0.02 grams per brake horsepower-hour.

(ii) NMHC using the emission calculation method specified in 40 CFR 1065.650(a)(3): 0.01 grams per brake horsepower-hour.

(iii) NMHC using an alternative emission calculation method as approved by the Administrator under 40 CFR 1065.915(d)(5)(iv): 0.01 grams per brake horsepower-hour.

(iv) CO using the emission calculation method specified in 40 CFR 1065.650(a)(1): 0.5 grams per brake horsepower-hour.

(v) CO using the emission calculation method specified in 40 CFR 1065.650(a)(3): 0.25 grams per brake horsepower-hour.

(vi) CO using an alternative emission calculation method as approved by the Administrator under 40 CFR 1065.915(d)(5)(iv): 0.25 grams per brake horsepower-hour.

(vii) NO_X using the emission calculation method specified in 40 CFR 1065.650(a)(1): 0.45 grams per brake horsepower-hour.

(viii) NO_X using the emission calculation method specified in 40 CFR 1065.650(a)(3): 0.15 grams per brake horsepower-hour.

(ix) NO_X using an alternative emission calculation method as approved by the Administrator under 40 CFR 1065.915(d)(5)(iv): 0.15 grams per brake horsepower-hour.

(x) NO_X + NMHC using the emission calculation method specified in 40 CFR 1065.650(a)(1): 0.47 grams per brake horsepower-hour.

(xi) NO_X + NMHC using the emission calculation method specified in 40 CFR 1065.650(a)(3): 0.16 grams per brake horsepower-hour.

(xii) NO_X + NMHC using an alternative emission calculation method as approved by the Administrator under 40 CFR 1065.915(d)(5)(iv): 0.16 grams per brake horsepower-hour.

(xiii) PM: To be determined by rulemaking as indicated in § 86.1935.

(5) Accuracy margins for portable in-use equipment when testing is not performed under the special provisions of § 86.1930 for 2010 or later model year engines families that are selected for testing in any calendar year as follows:

(i) NMHC using any emission calculation method specified in 40 CFR 1065.650(a) or an alternative emission calculation method as approved by the Administrator under 40 CFR 1065.915(d)(5)(iv): 0.01 grams per brake horsepower-hour.

(ii) CO using any emission calculation method specified in 40 CFR 1065.650(a) or an alternative emission

calculation method as approved by the Administrator under 40 CFR 1065.915(d)(5)(iv): 0.25 grams per brake horsepower-hour.

(iii) NO_X using any emission calculation method specified in 40 CFR 1065.650(a) or an alternative emission calculation method as approved by the Administrator under 40 CFR 1065.915(d)(5)(iv): 0.15 grams per brake horsepower-hour.

(iv) PM: To be determined by rulemaking as indicated in § 86.1935.

(b) For the purposes of this subpart, a valid NTE sampling event consists of at least 30 seconds of continuous operation in the NTE control area. An NTE event begins when the engine starts to operate in the NTE control area and continues as long as engine operation remains in this area (see § 86.1370). When determining a valid NTE sampling event, exclude all engine operation in approved NTE limited testing regions under § 86.1370–2007(b)(6) and any approved NTE deficiencies under § 86.007–11(a)(4)(iv). Engine operation in the NTE control area of less than 30 contiguous seconds does not count as a valid NTE sampling event; operating periods of less than 30 seconds in the NTE control area, but outside of any allowed deficiency area or limited testing region, will not be added together to make a 30 second or longer event. Exclude any portion of a sampling event that would otherwise exceed the 5.0 percent limit for the time-weighted carve-out defined in § 86.1370–2007(b)(7). For EGR-equipped engines, exclude any operation that occurs during the cold-temperature operation defined by the equations in § 86.1370–2007(f)(1).

(c) Calculate the average emission level for each pollutant over each valid NTE sampling event as specified in 40 CFR part 1065, subpart G, using each NTE event as an individual test interval. This should include valid NTE events from all days of testing.

(d) Calculate a time-weighted vehicle-pass ratio (R_{pass}) for each pollutant. To do this, first sum the time from each valid NTE sampling event whose average emission level is at or below the NTE threshold for that pollutant, then divide this value by the sum of the engine operating time from all valid NTE events for that pollutant. Round the resulting vehicle-pass ratio to two decimal places.

(1) Calculate the time-weighted vehicle-pass ratio for each pollutant as follows:

$$R_{pass} = \frac{\sum_{m=1}^{n_{pass}} t}{\sum_{k=1}^{n_{total}} t}$$

Where:

n_{pass} = the number of valid sampling events for which the average emission level is at or below the NTE threshold.

n_{total} = the total number of valid NTE sampling events.

(2) For both the numerator and the denominator of the vehicle-pass ratio, use the smallest of the following values for determining the duration, t, of any NTE sampling event:

(i) The measured time in the NTE control area that is valid for an NTE sampling event.

(ii) 600 seconds.

(iii) 10 times the length of the shortest valid NTE sampling event for all testing with that engine.

(e) The following example illustrates how to select the duration of NTE sampling events for calculations, as described in paragraph (d) of this section:

NTE sample	Duration of NTE sample (seconds)	Duration Limit Applied?	Duration used in calculations (seconds)
1	45	No	45
2	168	No	168
3	605	Yes. Use 10 times shortest valid NTE.	450
4	490	Yes. Use 10 times shortest valid NTE.	450
5	65	No	65

(f) Engines meet the vehicle-pass criteria under this section if they meet both of the following criteria:

(1) The vehicle-pass ratio calculated according to paragraph (d) of this section must be at least 0.90 for each pollutant.

(2) For model year 2007 through 2009 engines, emission levels from every valid NTE sampling event must be less than 2.0 times the NTE thresholds calculated according to paragraph (a) of this section for all pollutants, except that engines certified to a NO_X FEL at or below 0.50 g/bhp-hr may meet the vehicle-pass criteria for NO_X if measured NO_X emissions from every valid NTE sample are less than either 2.0 times the NTE threshold for NO_X or 2.0 g/bhp-hr, whichever is greater.

[70 FR 34619, June 14, 2005, as amended at 73 FR 13450, Mar. 13, 2008]

§ 86.1915 What are the requirements for Phase 1 and Phase 2 testing?

For all selected engine families, you must do the following:

(a) To determine the number of engines you must test from each selected engine family under Phase 1 testing, use the following criteria:

(1) Start by measuring emissions from five engines using the procedures described in § 86.1375. If all five engines comply fully with the vehicle-pass criteria in § 86.1912 for all pollutants, you may stop testing. This completes your testing requirements under this subpart for the applicable calendar year for that engine family.

(2) If one of the engines tested under paragraph (a)(1) of this section fails to comply fully with the vehicle-pass criteria in § 86.1912 for one or more pollutants, test one more engine. If this additional engine complies fully with the vehicle-pass criteria in § 86.1912 for all pollutants, you may stop testing. This completes your testing requirements under this subpart for the applicable calendar year for that engine family.

(3) If your testing results under paragraphs (a)(1) and (2) of this section do not satisfy the criteria for completing your testing requirements under those paragraphs for all pollutants, test four additional engines so you have tested a total of ten engines.

(4) An engine that fails to fully comply with the vehicle-pass criteria in § 86.1912 for any pollutant does not comply with the vehicle-pass criteria in § 86.1912 for the purposes of determining the number of engines to test from each selected engine family under this paragraph.

(b) For situations where a total of ten engines must be tested under paragraph (a)(3) of this section, the results of Phase 1 testing lead to the following outcomes:

(1) If at least eight of the ten engines comply fully with the vehicle-pass criteria in § 86.1912 for all pollutants, you may stop testing. This completes your testing requirements under this subpart for the applicable calendar year for that engine family.

(2) If six or seven vehicles from the Phase 1 sample of test vehicles comply fully with the vehicle-pass criteria in § 86.1912 for all pollutants, then you must engage in follow-up discussions with us to determine whether any further testing (including Phase 2 testing), data submissions, or other actions may be warranted.

(3) If fewer than six of the ten engines tested under paragraph (a) of this section comply fully with the vehicle-pass criteria in § 86.1912 for all pollutants, we may require you to initiate Phase 2 testing, as described in paragraph (c) of this section.

(4) You may under any circumstances elect to conduct Phase 2 testing following the completion of Phase 1 testing. All the provisions of paragraph (c) of this section apply to this Phase 2 testing.

(c) If you perform Phase 2 testing for any reason, test your engines as follows:

(1) You must test ten additional engines using the test procedures described in § 86.1375, unless we require you to test fewer vehicles.

(2) We may give you any of the following additional directions in selecting and testing engines:

(i) We may require you to select a certain subset of your engine family. This may include, for example, engines within a specific power range, engines used in particular applications, or engines installed in vehicles from a particular manufacturer.